Defense Technical Information Center
Compilation Part Notice

ADP013323

TITLE: Visualisation for the Command Post of the Future

DISTRIBUTION: Approved for public release, distribution unlimited
Availability: Hard copy only.

This paper is part of the following report:

TITLE: Multimedia Visualization of Massive Military Datasets [Atelier
OTAN sur la visualisation multimedia d'ensembles massifs de donnees
militaires]

To order the complete compilation report, use: ADA408812

The component part is provided here to allow users access to individually authored sections
of proceedings, annals, symposia, etc. However, the component should be considered within
the context of the overall compilation report and not as a stand-alone technical report.

The following component part numbers comprise the compilation report:
ADP013309 thru ADP013341

Visualisation for the Command Post of the Future

Bill Wright
Visual Insights Inc.
555 Richmond St. W., Suite 1108
Toronto, ON M5V 3B1, Canada
With the permission of Ward Page, CPOF Program Manager

Command Post of the Future: Introduction

The command post of the future (CPOF) is a DARPA program with several objectives:

(1) to increase the speed and quality of command decisions by means of
- Faster recognition and better understanding of changing battlefield situations
- faster and more complete exploration of available courses of action.

(2)Provide more effective dissemination of commands
- COA capture for dissemination of commander's intent
- Status and capability feedback from deployed operators

(3) Enable smaller, more mobile and agile command structures
- More mobile, distributed command element
- Smaller support tail & reduced deployment requirements

The CPof provides tailored visual renderings to assist immediate understanding
- Match user's cognitive model
- Portray uncertainties;
- Match the user's functional role
- Accommodate the user's background & preferences

We performed a set of limited objective experiments concerning CPOF.

Command Post of Today—Limitations

The characteristics of the current command post include:
- 60+ Workstations, 100+ people
- People are flooded by individual data streams
- Disjointed data systems; fragmented pictures of the battlefield
- No portrayal of uncertainties, inconsistencies or unknowns
- Requires too many people, too much communication

Some consequences are:
- Disjointed systems can cause negative situational awareness
- Increased time to comprehend the significance of information
- Incomplete, inaccurate understanding of the battlefield
- Delayed decisions while waiting for more data, understanding

Command Post of the Future—Operational Impact

Increased Operational Tempo will necessitate
- Faster recognition and better understanding of significant battlefield changes;
- Faster and more complete exploration of available courses of action; and
- More rapid and more accurate dissemination of commands

Smaller, More Mobile Command Structures also imply.
- Fewer staff members;
- Smaller support trail & reduced deployment requirements; and
- More mobile, distributed command organizations

The CPof also anticipates an Increased Span of Control

Results of the Experiments:

Tailored visualizations improved Situation Awareness in measures
- CPOF strongest in complex situations
- CPOF strongest in force-on-force situations
- CPOF strongest in understanding adversary's situation
- Different Strengths Emerged from Alternative CPOF technologies

Time Issues and Others
- Some changes due to control scores getting worse rather than CPOF scores greatly improving
- Time appeared to help in case where visualization technique introduced new concept
- Longer viewing time did not always result in higher scores
- CPOF Technologies generated better situation awareness, particularly in complex situations.
- CPOF Technologies provided better situation awareness than Control, prompted and unprompted, in Force-on-Force situations

Summary
- CPOF technologies had a significant impact on performance as measured.
- CPOF experimental approach captures the strengths and weaknesses
- CPOF technologies appear to improve subjects' overall Situation Awareness compared to traditional methods
- CPOF experimental approach captures strengths and weaknesses of each treatment

Discussion – Paper 13

Visualisation for the Command Post of the Future

- Problems
  - Support increased operational tempo
  - Smaller more mobile command structures
  - Increase speed and quality of command decisions
  - Tailored visualizations
  - Needs to be decision-centered

Bill Wright (Visual Insights)
- Command post today
  - 60+ workstations 100+ people
  - disjoint data systems, fragmented pictures
- CPOF Experiments
  - Experimental structures (battle lab students –40, Aces 8-15)
  - Known scenarios (asymmetric, Guerilla, Urban disaster, Peace Keeping, sustained operations
  - Use of control displays
  - Users could not interact with displays
  - Studied approaches based on the amount of time available
- LOE-1
  - DARPA Limited Objective Experiment
  - 3 cases being tested with 2 visualisation solutions and one control
  - force on force
  - insurgency
- D-Day Blob
  - 3 dimensional terrain
  - blobs showing deployment
  - thickness of line represents strength of force
  - diameter of blobs shows range of weapons
- Haiti Sit4B –5 Critical events (Visual Insights)
  - Set of text reports on situation
  - Time space and event view on 2D map
  - Show observed events in regions
- Treatment B
  - Used 2D map with integrated charts icons and drill down to charts

- Significant Findings
  - Visualizations generated better situation awareness
  - Visualizations very large improvement in complex situations
  - Blobs better than color coding
  - Drill down method found better than everything on one screen
  - More time helped only in more complex situations
- How is situation awareness defined? –complex definition defined by CPOF